THERAPEUTIC COMPOSITIONS COMPRISING IMIDAZOLE AND IMIDAZOLIUM COMPOUNDS

CROSS REFERENCE TO RELATED APPLICATIONS

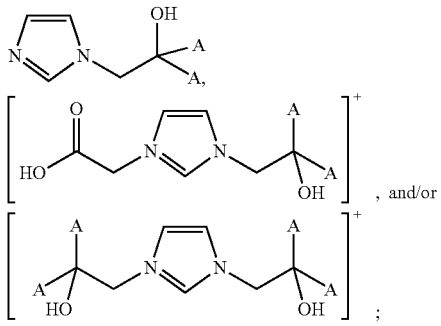
This application is a continuation of U.S. patent application Ser. No. 14/968,514, filed on Dec. 14, 2015, which is a continuation of U.S. patent application Ser. No. 14/540,333, filed on Nov. 13, 2014, now U.S. Pat. No. 9,216,168, which is a continuation of U.S. patent application Ser. No. 14/481,097, filed on Sep. 9, 2014, now U.S. Pat. No. 8,962,599, which is a continuation of a U.S. patent application Ser. No. 14/288,720 filed on May 28, 2014, now U.S. Pat. No. 8,865,757; U.S. patent application Ser. No. 14/540,333 is also a continuation of a U.S. patent application Ser. No. 14/288,241, filed on May 27, 2014, now U.S. Pat. No. 8,901,161, all of which are hereby incorporated by reference in their entireties.

FIELD

Some embodiments relate to therapeutic compositions comprising substituted imidazoles and imidazoliums having multiple acidic groups.

SUMMARY

Pharmaceutical compositions comprising:



, and/or

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wherein each A is independently an acidic functional group, may be used for a number of medical purposes, such as treatment of undesirable conditions or diseases, including disease or conditions related to bone, cancer, and/or pain. In some embodiments, each A is CO_2H, SO_3H, OSO_2, or PO_3H_2.

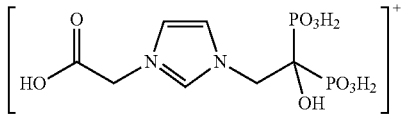
Some embodiments include a dosage form, such as an oral dosage form, comprising a composition described herein.

Some embodiments include a method of treating a disease or condition related to bone, cancer, or pain, comprising administering a dosage form, such as an oral dosage form, comprising a composition described herein to a mammal in need thereof.

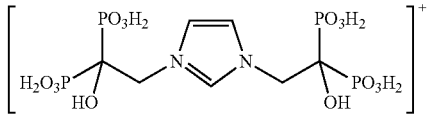
DETAILED DESCRIPTION

Preferably, pharmaceutical compositions comprising zoledronic acid, Compound 1, and/or Compound 2 (subject compositions), may be used for a number of medical purposes, such as treatment of undesirable conditions or diseases, including disease or conditions related to bone, cancer, and/or pain. This may be accomplished in many instances by administration of dosage forms, such as oral dosage forms, comprising a subject composition. Generally, an oral dosage form comprising a subject composition is administered orally to a mammal, such as a human being, at least once, to treat a disease or condition, such as disease or condition related to bone, cancer, or pain.

Ion 1



Ion 2



The term "treating" or "treatment" broadly includes any kind of treatment activity, including the diagnosis, cure, mitigation, or prevention of disease in man or other animals, or any activity that otherwise affects the structure or any function of the body of man or other animals.

An oral dosage form comprising a subject composition may be used to treat, or provide relief of, any type of pain including, but not limited to, inflammatory pain, arthritis pain, complex regional pain syndrome, lumbosacral pain, musculoskeletal pain, neuropathic pain, chronic pain, cancer-related pain, acute pain, postoperative pain, etc. In some instances, pain relief may be palliative, or pain relief may be provided independent of improvement of the disease or condition or the underlying cause of the disease or condition. For example, although the underlying disease may not improve, or may continue to progress, an individual suffering from the disease may experience pain relief. In some embodiments, enhanced bioavailability of the zoledronic acid may be achieved in treating one of these conditions by administering a dosage form comprising a subject composition wherein zoledronic acid is in the form of a disodium salt. This may allow a reduced molar amount of the disodium salt to be used as compared to what would be used with the diacid form.

In some embodiments, the mammal being treated is not suffering from bone metastasis. In some embodiments, the mammal being treated is not suffering from cancer. In some embodiments, the mammal being treated is not suffering from osteoporosis.

For example, a subject composition may be administered orally to relieve musculoskeletal pain including low back pain, and pain associated with rheumatoid arthritis, juvenile rheumatoid arthritis, osteoarthritis, erosive osteoarthritis, sero-negative (non-rheumatoid) arthropathies, non-articular rheumatism, peri-articular disorders, axial spondyloarthritis including ankylosing spondylitis, Paget's disease, fibrous dysplasia, SAPHO syndrome, transient osteoarthritis of the hip, vertebral crush fractures, osteoporosis, etc. In some embodiments, enhanced bioavailability of the zoledronic acid may be achieved in treating one of these conditions by administering a dosage form comprising a subject composition, wherein the zoledronic acid is in the form of a disodium salt. This may allow a reduced molar amount of the disodium salt of zoledronic acid to be used as compared to what would be used with the diacid form.